Climate Change Corner

Volcanic eruptions and natural rainfall variability in Hong Kong

Extreme rainfall variability is responsible for the occurrence of drought and flood years. However, in spite of recent advances in weather forecasting, the accurate prediction of annual rainfall has remained one of the greatest challenges in the field of climate science.

Based on case studies of annual rainfall record at the Hong Kong Observatory's Nathan Road station since 1884 aided by meteorological observations, reports of climatic disasters and satellite tracking of volcanic eruptions available since the early 1980s, the following conclusions have been drawn:

1. The driest year on record with 901.1 mm of rain is 1963. This is attributed to the eruption of the Agung volcano in Bali, Indonesia in February/March 1963.
2. The second wettest year on record with 3,274.5 mm of rain is 1982. This is attributed to the eruption of the El Chichõn volcano in Mexico in March/April 1982.
3. The eleventh driest year on record with 1,639.1 mm of rain is 1991. This is attributed to the eruption of the Pinatubo volcano in the Philippines in June 1991.
4. The sixth wettest year on record with 3,066.2 mm of rain is 2008. This is attributed to the eruption of the Chaitén volcano in Chile on 2 May 2008.
5. The maximum one-hour rainfall in Hong Kong's history with 145.5 mm of rain occurred on 7 June 2008 and the wettest June on record with 1,346.1 mm of rain is 2008. Both are attributed to the eruption of the Chaitén volcano in Chile on 2 May 2008.

The conclusions drawn are accounted for by the spread of the eruption cloud in combination with the transfer of water vapour into the stratosphere and regional circulation changes during the year.

There is therefore an underestimation of the role of volcanic eruptions as a natural cause of rainfall variability. Climate change prediction methods must also take into account volcanic eruption events.

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